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ABSTRACT

The Third International Mathematics and Science Study (TIMSS), the largest international comparative study of educational achievement to date, is a study of classrooms across the country and around the world. This brief information booklet describes the design and development of TIMSS, its coordination and schedule, and its components including student assessments, performance assessments, questionnaires, curriculum analysis, videotape observations, and case studies. Also highlighted are the research questions that guided TIMSS. (JRH)

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What is TIMSS?

TIMSS - the Third International Mathematics and Science Study - is a study of classrooms across the country and around the world. It is the largest international comparative study of educational achievement to date.

The National Center for Education Statistics (NCES) of the U.S. Department of Education, the National Science Foundation (NSF), and the Canadian Government funded the international TIMSS project to assess school achievement in mathematics and science in nearly 50 countries. TIMSS studies student outcomes, instructional practices, curricula, and cultural context. The international coordination of TIMSS activities is centered at Boston College under the direction of Professor Albert Beaton.

One of the driving forces behind TIMSS is the recognition by policymakers that mathematic and scientific literacy affect economic productivity. World-class competence in math and science is essential to compete successfully in today's interdependent global marketplace. TIMSS provides a comparative international assessment of educational achievement in those two subjects and the factors that contribute to it.

Components of TIMSS

TIMSS has many parts. All countries participating in the study were included in the student assessments, questionnaires, and curriculum analysis. Approximately half of the countries also participated in the performance assessments.

To acquire a better understanding of contextual factors contributing to achievement, NCES designed two unique additions to the TIMSS project which were carried out in Japan, Germany, and the United States. These two additions are videotape observations of mathematics instruction, and ethnographic case studies of key policy topics.

Finally, states and districts in the U.S. were offered the opportunity to participate in TIMSS as if they were nations to understand how their students compare to those of countries throughout the world.

Student Assessments. Assessment booklets contained multiple-choice and free-response items. Students across the nations in three distinct target populations were assessed:

- **Population 1:** students in the two adjacent grades containing most 9-year-olds (U.S. grades 3 and 4);
- **Population 2:** students in the two adjacent grades containing most 13-year-olds (U.S. grades 7 and 8); and
- **Population 3:** students enrolled in the final year of secondary school, regardless of their program of study (U.S. grade 12), as well as a special sample of calculus and physics students.

Performance Assessments. A random subsample of students in Populations 1 and 2 who took the main assessment were selected for an additional series of hands-on mathematics and science tasks.

Questionnaires. Students filled out questionnaires about background factors related to achievement, including their opinions about mathematics and science. Teachers answered questions about lesson structure and context, as well as beliefs about teaching math and science. School administrators answered questions about the implemented curriculum, staffing levels, availability of resources, in-service education, and retention rates.

Curriculum Analysis. A content analysis of science and mathematics textbooks and curriculum guides from the participating countries was begun prior to the assessments. The curriculum analysis studied the materials for their topic content and sequencing. The materials were divided into comparable units and coded for analysis. Dr. William Schmidt of Michigan State University managed this segment of the study.

Videotape Observations. Teachers from Grade 8 mathematics classes were videotaped to study what typically happens in the classroom. Observations were analyzed and a database was created for subsequent comparative analysis. This segment of the study was performed only in the United States, Japan, and Germany. Dr. James Stigler of the University of California-Los Angeles directed this segment of the study.

Case Studies. Researchers observed and conducted in-depth interviews with a small sample of students, teachers, and administrators. Topics of study included implementation of national standards, methods of dealing with ability differences, adolescents' attitudes toward school, and the daily lives and working environment of teachers. Dr. Harold Stevenson of the University of Michigan directed this component of the study.

U.S. TIMSS National Sample

	Participating Students	Participating Schools
■ 3rd–4th grade	11,114	189
■ 7th–8th grade	11,110	185
■ 12th grade	11,115	211

In April-May 1995, 33,339 students from 585 public and private schools across the U.S. participated in the TIMSS assessments. Scientific sampling procedures were used to ensure reliable national, regional, and state samples.

State TIMSS

States were offered the opportunity to assess a state-representative sample of their students at the same time as the U.S. National TIMSS. Participating states were responsible for all costs associated with State TIMSS.

District TIMSS

Some districts expressed an interest in receiving district-level data. Districts were offered the opportunity to participate as the states did, paying all costs and receiving district-representative data. District TIMSS occurred in April-May 1996.

TIMSS Research Questions

How do teachers in different countries teach?

■

How do their instructional practices differ? How do these differences affect learning? What can we learn from this?

■

What curriculum differences exist among the countries? What is taught and when? What is not covered?

■

What are the different social and cultural contexts with which this learning takes place? How do these affect learning? What lessons can we learn?

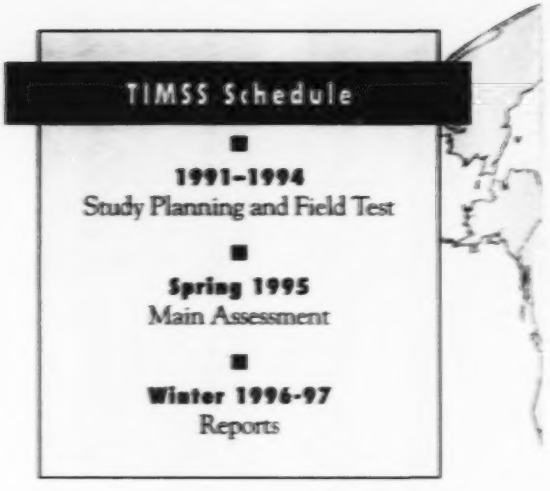
Who is Conducting TIMSS?

TIMSS is being coordinated by the International Association for the Evaluation of Educational Achievement (IEA), an independent international cooperative of research centers and departments of education in more than 50 countries. TIMSS has the largest complement of participants of any of IEA's international studies.

TIMSS was designed by task forces that included members from the many participating countries. These groups were involved in developing the tests and reviewing assessment instruments, questionnaires, and sampling plans. IEA monitored the sampling process, quality control, scaling of tests, and training. In addition, an International Steering Committee monitored the activities and progress of the study, and a U.S. Steering Committee was established to give advice on the implementation of the study in the United States.

Each participating country provided for its own data collection and analysis.

U.S. participation in TIMSS is funded by NCES and NSF. NCES oversees the collection, analysis, and reporting of the U.S. data, through a contract with Westat, Inc. Professor William Schmidt of Michigan State University is the U.S. national research coordinator.



More Information

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